

IN THE CLAIMS:

Please cancel claims 29-99.

Please note that all claims currently pending, after the cancellation of claims 29-99, and under consideration in the referenced application are shown below, in clean form, for clarity.

Please amend the claims as follows:

1. (Amended) A metallization structure for a semiconductor device, comprising:
a substrate comprising a substantially planar upper surface; and
a conductive line for transmitting a signal laterally across said substrate, said conductive line comprising:

a metal layer defining a pattern on a portion of the substrate upper surface;
a conducting layer overlying and substantially coextensive with the metal layer, said metal layer and said conducting layer having substantially aligned sidewalls; and
metal spacers flanking the sidewalls of the conducting layer and metal layer.

2. The metallization structure of claim 1, further comprising a dielectric layer on the substrate upper surface and underlying the metal layer.

3. The metallization structure of claim 2, wherein the dielectric layer is silicon oxide or BPSG.

4. The metallization structure of claim 1, wherein the metal layer is a first metal layer comprising Ti, Ta, W, Co or Mo or alloys or compounds thereof, including TaN or TiN.

5. The metallization structure of claim 4, further including a second metal layer disposed between the first metal layer and the substrate and comprising TiN, TiW, WN, or TaN.

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6. The metallization structure of claim 5, wherein the first metal layer comprises titanium or titanium nitride.

7. The metallization structure of claim 1, wherein the metal layer is titanium or titanium nitride.

8. The metallization structure of claim 1, wherein the conducting layer is selected from the group comprising aluminum and copper.

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9. The metallization structure of claim 8, wherein the conducting layer is an aluminum-copper alloy.

10. The metallization structure of claim 1, wherein the metal spacers comprise at least one layer of Ti, Ta, W, Co or Mo, or alloys thereof or compounds thereof, including TaN and TiN.

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11. (Twice amended) The metallization structure of claim 1, wherein the metal spacers are titanium or titanium nitride.

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12. (Previously amended) The metallization structure of claim 1, further comprising a dielectric layer on the conducting layer and having sidewalls aligned with said sidewalls of the conducting layer, the metal spacers extending along the sidewalls of the dielectric layer.

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13. The metallization structure of claim 12, wherein the dielectric layer comprises a low dielectric constant material.

14. The metallization structure of claim 13, wherein the dielectric layer is fluorine-doped silicon oxide.

15. The metallization structure of claim 1, wherein the metal layer and the metal spacers comprise the same metal.

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CH 16. (Amended) A metallization structure for a semiconductor device, comprising:
a substrate having a metal layer extending over said substrate, said metal layer at least underlying a conductive line, said conductive line for transmitting a signal across said substrate;
a dielectric layer having an aperture therethrough defined by at least one sidewall and exposing the metal layer, said aperture flanking said conductive line;
a metal spacer abutting at least one sidewall of said at least one sidewall of the aperture; and
a conductive layer substantially filling a remaining portion of the aperture.

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cont. 17. The metallization structure of claim 16, wherein the metal layer comprises tantalum, titanium, tungsten, cobalt, molybdenum, or an alloy or a compound of any thereof, including TaN and TiN.

B1 18. The metallization structure of claim 17, wherein the metal layer is titanium or titanium nitride.

19. (Previously amended) The metallization structure of claim 16, wherein the metal spacer includes at least one layer of metal comprising tantalum, titanium, tungsten, cobalt, molybdenum, or alloys or compounds thereof, including TaN and TiN.

20. (Previously amended) The metallization structure of claim 19, wherein the metal spacer is titanium or titanium nitride.

21. The metallization structure of claim 16, wherein the substrate comprises a dielectric layer underlying the metal layer.

22. (Previously amended) The metallization structure of claim 21, wherein the dielectric layer underlying the metal layer is silicon oxide or BPSG.

23. (Previously amended) The metallization structure of claim 16, wherein the metal layer and the metal spacer comprise the same metal.

24. The metallization structure of claim 16, wherein the metal layer is a first metal layer comprising Ti, Ta, W, Co or Mo or an alloy or a compound of any thereof, including TaN or TiN.

25. The metallization structure of claim 24, further including a second metal layer disposed between the first metal layer and the substrate and comprising TiN, TiW, WN, or TaN.

cont.
B1 26. The metallization structure of claim 16, further comprising at least one upper metal layer on the conductive layer and comprising Ti, Ta, W, Co or Mo or an alloy or a compound of any thereof, including TaN or TiN.

27. The metallization structure of claim 26, wherein the at least one upper metal layer comprises a plurality of upper metal layers.

28. (Previously amended) The metallization structure of claim 26, wherein the at least one upper metal layer comprises titanium or titanium nitride.

Please add the following new claims:

B2 100. (New) The metallization structure of claim 2, wherein said dielectric layer extends completely underneath said conductive line.

101. (New) The metallization structure of claim 16, wherein said aperture contains conductive material.

102. (New) A structure for transmitting a signal across a semiconductor device, said structure comprising:

a substrate comprising a substantially planar upper surface; and

a conductive line extending over said upper surface and isolated therefrom by a dielectric layer at least underlying said conductive line, said conductive line comprising:

a metal layer above said dielectric layer, said metal layer defining a pattern on a portion of the substrate upper surface;

a conducting layer overlying and substantially coextensive with the metal layer, said metal layer and said conducting layer having substantially aligned sidewalls; and

metal spacers flanking the sidewalls of the conducting layer and metal layer.

103. (New) The structure of claim 102, wherein the dielectric layer is silicon oxide or BPSG.

104. (New) The structure of claim 102, wherein the metal layer is a first metal layer comprising Ti, Ta, W, Co or Mo or alloys or compounds thereof, including TaN or TiN.

105. (New) The structure of claim 104, further including a second metal layer disposed between the first metal layer and the substrate and comprising TiN, TiW, WN, or TaN.

106. (New) The structure of claim 105, wherein the first metal layer comprises titanium or titanium nitride.

107. (New) The structure of claim 102, wherein the metal layer is titanium or titanium nitride.

108. (New) The structure of claim 102, wherein the conducting layer is selected from the group comprising aluminum and copper.

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109. (New) The structure of claim 108, wherein the conducting layer is an aluminum-copper alloy.

metal

110. (New) The structure of claim 102, wherein the metal spacers comprise at least one layer of Ti, Ta, W, Co or Mo, or alloys thereof or compounds thereof, including TaN and TiN.

111. (New) The structure of claim 102, wherein the metal spacers are titanium or titanium nitride.

112. (New) The structure of claim 102, further comprising a dielectric layer on the conducting layer and having sidewalls aligned with said sidewalls of the conducting layer, the metal spacers extending along the sidewalls of the dielectric layer.

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113. (New) The structure of claim 112, wherein the dielectric layer comprises a low dielectric constant material.

114. (New) The structure of claim 113, wherein the dielectric layer is fluorine-doped silicon oxide.

115. (New) The structure of claim 102, wherein the metal layer and the metal spacers comprise the same metal.

116. (New) A structure for transmitting a signal laterally across a substrate of a semiconductor device, said structure comprising:

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a substrate having a metal layer of a conductive line disposed thereon;
a dielectric layer above said metal layer, said dielectric layer having an aperture therethrough defined by at least one sidewall and exposing the metal layer, said aperture at least extending a length of said conductive line;
a metal spacer flanking at least one sidewall of said at least one sidewall of the aperture; and
a conductive layer substantially filling a remaining portion of the aperture.

117. (New) The structure of claim 116, wherein the metal layer comprises tantalum, titanium, tungsten, cobalt, molybdenum, or an alloy or a compound of any thereof, including TaN and TiN.

118. (New) The structure of claim 117, wherein the metal layer is titanium or titanium nitride.

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119. (New) The structure of claim 116, wherein the metal spacer includes at least one layer of metal comprising tantalum, titanium, tungsten, cobalt, molybdenum, or alloys or compounds thereof, including TaN and TiN.

120. (New) The structure of claim 119, wherein the metal spacer is titanium or titanium nitride.

121. (New) The structure of claim 116, wherein the substrate comprises a dielectric layer underlying the metal layer.

122. (New) The structure of claim 121, wherein the dielectric layer underlying the metal layer is silicon oxide or BPSG.

123. (New) The structure of claim 116, wherein the metal layer and the metal spacer comprise the same metal.

124. (New) The structure of claim 116, wherein the metal layer is a first metal layer comprising Ti, Ta, W, Co or Mo or an alloy or a compound of any thereof, including TaN or TiN.

125. (New) The structure of claim 124, further including a second metal layer disposed between the first metal layer and the substrate and comprising TiN, TiW, WN, or TaN.

126. (New) The structure of claim 116, further comprising at least one upper metal layer on the conductive layer and comprising Ti, Ta, W, Co or Mo or an alloy or a compound of any thereof, including TaN or TiN.

cont.
B2 127. (New) The structure of claim 126, wherein the at least one upper metal layer comprises a plurality of upper metal layers.

128. (New) The structure of claim 126, wherein the at least one upper metal layer comprises titanium or titanium nitride.

129. (New) The structure of claim 116, wherein said metal spacer extends substantially a height of said at least one sidewall.